

NON-PUBLIC?: N  
ACCESSION #: 9210140251  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Braidwood 2 PAGE: 1 OF 6

DOCKET NUMBER: 05000457

TITLE: Reactor Trip Due to Valve Mispositioning  
EVENT DATE: 09/10/92 LER #: 92-006-00 REPORT DATE: 10/09/92

OTHER FACILITIES INVOLVED: Braidwood 1 DOCKET NO: 05000456

OPERATING MODE: 1 POWER LEVEL: 099

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: P. Zolan, Regulatory Assurance TELEPHONE: (815) 458-2801

Ext. 2364

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

#### ABSTRACT:

On September 10, 1992 at 2126 hours CDST, Braidwood Unit 2 Control Room received a Feed Pump Turbine Exhaust Vacuum Low annunciator. Three Control Room Operators all noted dual indication on valve 2ES095A, which is the Turbine Driven Feedwater Pump Exhaust Valve. Within approximately twenty seconds, the 2B Turbine Driven Feedwater Pump tripped. The U-2 NSO responded immediately and manually initiated an automatic turbine runback. Approximately one minute later, due to the decreasing secondary side level on the steam generators, the reactor tripped on Low-Low Steam Generator Level on the 2A Steam Generator. All reactor protection systems responded as designed and all control rods fully inserted into the core. Both Auxiliary Feedwater pumps started as expected and restored all Steam Generator levels to the proper level. Normal Feedwater was reestablished utilizing the Startup Feedwater Pump at 2206 hours.

The event was caused by a personnel error by a contractor, who manipulated the valve on the operating unit instead of the outage unit that he was working on. There have been no previous occurrences of this type at Braidwood Station.

END OF ABSTRACT

TEXT PAGE 2 OF 6

A: PLANT CONDITIONS PRIOR TO EVENT:

Unit: Braidwood 1; Event Date: September 10, 1992; Event Time: 2126  
Mode: 5 - Cold Shutdown, Day 6 of Refueling Outage

Unit: Braidwood 2; Event Date: September 10, 1992; Event Time: 2126  
Mode: 1 - Power Operation; Rx Power: 099%

RCS Section ABe Temperature/Pressure: NOT / NOP

B: DESCRIPTION OF EVENT:

There were no systems or components inoperable at the beginning of this event which contributed to the severity of the event.

On September 10, 1992 at 2126 hours CDST, Braidwood Unit 2 Control Room received a Feed Pump Turbine Exhaust Vacuum Low annunciator. The Unit 2 Nuclear Station Operator (U-2 NSO), the Unit 2 Unit Supervisor (U-2 US), and the Unit 2 Extra Nuclear Station Operator (U-2 ENSO) all noted dual indication on valve 2ES095A, which is the Turbine Driven Feedwater Pump Exhaust Valve. Within approximately twenty seconds, the 2B Main Feedwater Pump tripped due to loss of vacuum. The U-2 NSO responded immediately to the annunciator and manually initiated an automatic turbine runback. Approximately one minute later, due to the decreasing secondary side level on the steam generators, the reactor tripped on Low-Low Steam Generator Level on the 2A Steam Generator. All reactor protection systems responded as designed and all control rods fully inserted into the core. Both Auxiliary Feedwater pumps started as expected on the Steam Generator shrink transient and the loss of Feedwater, and restored all Steam Generator levels to the proper level. Normal Feedwater was reestablished utilizing the Startup Feedwater Pump at 2206 hours.

Upon hearing the Feedwater Pump trip, operators who were in the plant at the time also immediately responded and went to the

vicinity of the pump. It was found that valve 2ES095A, which is the 2B Feedwater Pump Exhaust Duct. Isolation Damper, was partially throttled from the full open (normal) position to a partially closed position. This valve being partially closed resulted in high back pressure in the pump, which actuated 2PS-FW196 Vacuum Interlock Switch and tripped the pump.

Extensive troubleshooting was performed on valve 2ES095A and its associated instrumentation that evening and the following day. No problems could be identified. No work was either being performed or scheduled in the area of the pump or the valve that day.

Investigation by station Regulatory Assurance on September 11, 1992 found that work was being performed on the corresponding valve on Unit 1 (1ES095A) the evening of September 10 by GN Venture contractor personnel during that unit's scheduled refueling outage.

TEXT PAGE 3 OF 6

Interviews by station and contractor supervision with the crew involved in this work revealed that as a part of their work on 1ES095A, they found it necessary to manipulate the valve. While the valve itself is located approximately seventeen feet above the floor on elevation 401 in the plant and required scaffolding to access, the handwheel operator protrudes down through the floor of elevation 426 above, and is connected to the valve by an eight foot long shaft. There is no direct visual way to see the valve actuator itself from the valve operator. This layout is identical on Unit 1 and 2. The following is a sequence of events for the work that was performed by the contractor crew that evening. Note that all times are approximate.

At 1645, the contractor foreman and his four crew members reviewed the work package and the drawings within it to facilitate locating the valve. All five initially proceeded up the Unit 2 (east) stairway to search for the valve handwheel for 1ES095A. Because of the condition of the drawing that they were using, which showed the locations of both the Unit 1 and Unit 2 valves, they initially proceeded to the wrong valve, 2ES095A. The foreman checked the valve tag and recognized that they were in the wrong unit and at the wrong valve. No work or actions were taken at that time on valve 2ES095A.

A closer review of the location drawing in the work package revealed the other column designator for the Unit 1 valve. The foreman and his crew then entered the Unit 1 portion of the Turbine Building and

proceeded to the correct valve, approaching the valve from the east.

They ensured that they were looking at the correct valve by verifying the proper tag number and the work request equipment tag. The foreman noted that the work request tag attached to the hand wheel did not match the work request contained in the work package.

The crew proceeded back to the Unit 2 stairway, walked down to elevation 401 and located the scaffolding that had been erected for work on the subject valve. The foreman noted that similar to the handwheel, the work request tag number attached to the valve actuator did not match the work request in the work package. The General Foreman for the job was consulted, and it was verified that the scaffolding was in fact in the correct location and that the missing work request tag was not uncommon.

During disassembly of the limit switch assembly plate from the valve actuator, it was discovered that the actuator's position indicator was blocking removal of one of the bolts. The foreman checked with the General Foreman to ensure that rotation of the 1ES095A handwheel was permissible. After reviewing the work package steps, the two foremen agreed that the handwheel could be rotated to allow limit switch plate removal.

At approximately 2122, the foreman directed one of the crew members to go to elevation 426 and rotate the handwheel on 1ES095A enough for the position indicator to clear the bolt head. The crew member proceeded to elevation 426 via a different stairway than previously used, approaching the area from the west, and located the valve that looked like the valve that the crew had located with their foreman approximately five hours earlier. He read the valve tag as "ES095A" and believing that he was at 1ES095A turned the hand wheel several turns. He then returned to the work crew location on elevation 401 by way of the same (west) stairway.

TEXT PAGE 4 OF 6

When he arrived back at the work location, the foreman asked whether he had turned the hand wheel on valve 1ES095A, and the crew member replied that he had. The foreman questioned whether it moved the position indicator, and both individuals went up to the Unit 1 handwheel via the Unit 2 stairway and approached the valve from the east. The crew number indicated that this was the handwheel that he had turned. Both men returned to the work location via the Unit 2 stairway, where the other crew members had managed to remove the limit switch plate attachment bolt. The work defined in the work

package continued as planned. Since the job continued as planned for the rest of the shift, the crew did not recognize that the incorrect valve had been manipulated. All crew members were back on the Unit 1 side of the plant when Unit 2 tripped, and therefore did not see the Operating crews responding to the tripped Feedwater Pump.

This event is being reported pursuant to 10CFR50.73(a)(2)(iv) - any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System.

#### C: CAUSE OF EVENT

The primary cause of the event was a cognitive personnel error on the part of the contractor crew member. He operated the valve without verifying, by use of the full equipment number on the equipment tag, that he was at the correct location. Verification of the correct number attached to the handwheel of valve 2ES095A would have prevented this event.

A contributing cause was a programmatic deficiency in the general color coding and labeling in the plant. Areas in the plant are generally color coded according to a Unit designator. Yellow signifies Unit 1, green signifies Unit 2, and blue is used for common areas. The valve handwheels for both the Unit 1 and 2 valves were painted brown, as is much of the equipment in the turbine building. The unit color code designators are primarily used on equipment tags and labels in the plant, and less so on actual equipment. When the crew member accessed the wrong valve by himself from the west stairway, he passed a number of items, such as handrails, access ladders, and pipe supports, that are painted yellow for safety reasons (ie. visibility). This led to his comfort level that he was in the correct unit. Additionally, as one ascends the stairs that the crew member used, one faces directed toward a doorway that separates the two Units. This door is clearly labeled "Unit 1 Turbine Room" with a yellow stripe on either side of the words. While this is intended to signify that you are entering Unit 1 as you pass, through the doorway, to an individual not as familiar with the station whose awareness is concentrated elsewhere, it may serve to confirm his presence in that Unit.

#### D: SAFETY ANALYSIS

The safety consequences of this event were minimal. All plant equipment responded as designed. Due to the design of the Steam

Generators on Unit 2 (Westinghouse Model D5), the automatic turbine runback that was immediately initiated by the U-2 NSO was not able to reduce power quickly enough to compensate for the reduction in feedwater flow after the Feedwater Pump trip.

Since this event occurred at effectively full power, there are no initial conditions that could have served to establish a more severe set of initial plant conditions. Had this event occurred at lower power levels, named below sixty percent power, the turbine runback would not have been necessary to prevent a reactor trip, as one feedwater pump is adequate to supply the steam generators below this power level.

TEXT PAGE 5 OF 6

#### E: CORRECTIVE ACTIONS

All GNV craftspersons were trained on the requirements of their Site Work Instruction SWI-4, Equipment Identification and Tagging. Training of complete work crews occurred simultaneously, including the crew foreman. Unit identification, equipment identification, work package tags, and equipment tag match-up were all specifically addressed.

The Braidwood Station self checking methodology, "STAR", will be provided as training to craft workers. This will be tracked to completion by action item 457-180-92-00601.

Individual counseling was conducted for the crew involved with this event. Items that were stressed were the need for attention to detail and the attributes of self checking, along with the need to openly communicate with supervisory personnel whenever there is a potential that any aspect of a work process did not proceed as planned.

GNV issued a letter to all employees outlining the seriousness of unit equipment misidentification and its possible consequences. Employees who do not readily understand unit unique identifiers were instructed to discuss the issue with their supervisor immediately.

Contractor Quality Control personnel were assigned to confirm that all work tags are in place before any new work activities begin. This was done from September 14 through October 4, 1992. To ensure continued compliance, tests activity has been included in quality control in-process inspections and surveillances.

The contractor has also begun to include in their daily shift briefings to all workers the operating status on both units, the shutdown risk factors for each of the major categories of plant equipment, critical work activities being performed on their shift, and other timely topics.

The valve handwheels and bases for 1/2ES095A and B, along with other similar valves with remote operators extending through the floor in the Turbine Building, were painted the appropriate unit designated color.

Large signs were posted on the doors separating the two units, indicating that one is entering the outage or operating unit, as appropriate. Similar signs were also posted on stanchions on the plant elevations where wells and doors do not separate the two units.

To eliminate the possibility of inadvertent operation of the 1/2ES095A/B valves, locking devices have been installed. This was done because the valves are very easy to manipulate, are located in a high traffic area. and require a relatively small number of turns to completely reposition.

TEXT PAGE 6 OF 6

Although it is felt that Non-Station Personnel Orientation training contains the necessary information on the proper identification of equipment, the emphasis may not be appropriate for the transient craft worker. Therefore, these lesson plans will be reviewed. This will be tracked to completion by action item 457-180-92-00602.

#### F. PREVIOUS OCCURRENCES

Braidwood Station has not experienced any previous occurrence of a contractor mispositioning plant equipment and causing a reactor trip.

#### G. COMPONENT FAILURE DATA

This event was not the result of component failure, nor did any components fail as a result of this event.

ATTACHMENT 1 TO 9210140251 PAGE 1 OF 1

Commonwealth Edison  
Braidwood Nuclear Power Station

Route #1, Box 84  
Braceville, Illinois 60407  
Telephone 815/458-2801

October 9, 1992  
BW/92-0520

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D. C. 20555

Dear Sir:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted to you with the requirement of 10CFR50.73(a)(2)(iv) which requires a 30-day written report.

This report is number 92-006-00, Docket No. 50-457.

K. L. Kofron  
Station Manager  
Braidwood Nuclear Station

KLK:AJS:dla  
639/ZD85G

Encl: Licensee Event Report No.92-006-00

cc: NRC Region III Administrator  
NRC Resident Inspector  
INPO Record Center  
CECo Distribution List

\*\*\* END OF DOCUMENT \*\*\*

---